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PROCEEDINGS  
OF THE  
SECOND INTERNATIONAL CONFERENCE  
OF  
AGRICULTURAL ECONOMISTS

HELD AT  
CORNELL UNIVERSITY,  
ITHACA; NEW YORK,  
AUGUST 18 TO AUGUST 29, 1930

*The Collegiate Press*  
GEORGE BANTA PUBLISHING COMPANY  
MENASHA, WISCONSIN

1930

## THE ECONOMIC CLASSIFICATION OF FARMS AS A BASIS OF AGRICULTURAL ADVISORY WORK

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WHEN invited to make some contribution to the proceedings of this Conference I thought it might be of some general interest, and more especially to those actively concerned in problems of farm management, to give an outline of what is being done in the Bristol Province in agricultural advisory work, with special reference to attempts at the economic classification of farms.

This province, as it is called, consists of the five counties of Somerset, Wilts, Gloucester, Hereford and Worcester, and comprises nearly 44,000 farms, 15,000 of which are above, and the remainder below 50 acres. Generally speaking, it is a grassland area, although nearly all farms will have some arable crops, and the type of farming would be generally classed as "mixed." Somerset and Wiltshire are largely concerned with producing milk for the London market, but the former produces more pigs—in connection with its cheesemaking—while the latter grows more cereals. Gloucestershire produces more milk for local towns and for London, and has a good deal of grazing land for beef cattle and sheep. Hereford is generally noted for its beef cattle bearing that name, while Worcestershire is in part a county of very intensive production of soft fruits and vegetables for the Midland and London markets. Sheep are kept in all five counties, but chiefly in Wiltshire and Somerset. The latter county is also noted for its cider.

The above is only intended to be a sketch of the kind of farming to be found in this area, but the point I wish to emphasise is that it is a region of highly diversified farming, and if the statement that, "No two farms are alike," applies to any area it undoubtedly applies here.

In common with other advisory districts in England, a staff of specialists in other branches of agricultural science is maintained at Bristol, and of these branches the most important are the ones dealing with the treatment of grassland, the development and improvement of various kinds of orchards, and the feeding of dairy cows. Requests for advice upon these matters have increased

so rapidly during the past two or three years that the increases in staff have not kept pace with the growing volume of work.

The three specialists concerned with these branches have recently requested the economist to ascertain whether or not some simple method of classifying farms in this area cannot be evolved, in order that the economic position of any farm requiring advice upon the three subjects just mentioned, may be defined sufficiently accurately for their purposes. Obviously any one of these specialists can, and does, advise farmers how many hundredweights of fertilizer per acre may be necessary to produce better grass or fruit, or how to feed dairy cows to produce more milk, but they realise that such advice may not always be justified, or at any rate may need modification when the economic position of the farm as a whole is considered.

The economic section has thus, in its turn, been recently faced with a large extension of its work without corresponding increase in staff, and the question resolved itself into one of placing any farm into its appropriate economic class, without the expenditure of too much labour, and without calling upon the farmer for full financial records.

It seems to me that in a region of highly diversified farming the economist, in classifying his farms, has three options. He may place them in such large classes that the resultant averages, and so forth, are almost meaningless; he may make the groups so small that he may just as well do no grouping at all; or he may decide upon the happy medium, and so classify his farms that the groups err in neither of these directions.

At the University we have 250 farms which submit full financial accounts for analysis and report, and experiments are being made with these to ascertain the most satisfactory methods of classification. Obviously there are several kinds of groups into which farms may be placed. Some of these are what may be termed primary, while others may be termed secondary classes. It is with the first type that this paper is concerned.

#### SOIL CLASSIFICATION

Our first attempt was to classify the farms according to types of soil. Only a rough classification could be made, since there does not exist any kind of soil map for any of the five counties forming the province. Resort was therefore had to grouping the soils

roughly into alluvium, loam, clay, sand, and so forth, with some note of the underlying geological formations. Although there are in some countries fairly detailed soil maps for certain areas, as far as I am aware this does not yet apply to England, and even if it did, I submit that the soil classification of farms is not as easy as it looks, nor as satisfactory as it is sometimes thought to be. This is especially the case in this area, where, owing to the great variety of soils within a small compass, a farm may have from six to a dozen types of soil on it. Moreover, how many persons engaged in agricultural advisory work know what is meant exactly by an acre of land for productive purposes? When statistics of production or expenditure are compiled upon the basis of an acre or a hundred acres, how much reliance can be placed upon them? The soil chemists themselves have not yet decided how to group soils, as witness their conference in Russia this summer. It may of course be argued that minute subdivision of soil types, such as the chemist needs, is not necessary for the economist. With this I fully agree, but the question still remains as to what extent this subdivision of soil types should be carried, in order to form a satisfactory foundation for some of the economist's calculations. This must perforce be left until the chemists arrive at a decision. For many farms, soil is a secondary consideration as far as economic questions are concerned.

#### RENTAL CLASSIFICATION

Let us now consider the question of grouping farms on a rental basis. Some people think that if the soil itself is an unsatisfactory basis of classification then the rental value may serve instead, the argument apparently being that rentals vary as the fertility of the soil, including in the term "fertility," distance from markets. In a newly settled country this is probably truer than in an old country. It is well known, however, that rentals depend upon more than this. Social amenities, and even those of the farmhouse itself, often result in a higher rent being offered for a farm than its capability for making profits would seem to warrant, and what economist can divide the payment made by such a tenant into these two or more parts?

A further complication when considering the use of rents as a basis of grouping, lies in the relating of farms in owner-occupation to those occupied by a tenant. In the former case the agricultural

economist, in England, usually accepts the assessed value for income tax purposes as the rental, since this is supposed to correspond to the amount the farm would obtain as cash rent if it were in fact let to a tenant. Experience at Bristol goes to show, however, that this is not always the case. Farm assessments, as we all know, are fairly difficult to make. Although in theory the relative burden of the assessment should be the same in all districts, in practice there is considerable variation, and successful appeals against assessments are not unknown. Moreover, even in the case of a single farm, the rental value as indicated by the assessment, has been known to be considerably different from the actual cash rent when the farm has been let to a tenant. On both sides, therefore, there are possibilities of error. The assessment on the owner-occupier depends upon the assessor's judgment, and, on the other hand, the cash rent paid by a tenant often depends upon factors other than the financial.

A still further complication in using rents as a basis for classification, at any rate as far as the Bristol area is concerned, arises from the fact that a considerable number of farms, in Wiltshire especially, have a large proportion of their acreage in poor thin soils on hillsides, while the remainder is fertile valley land. To divide the total rent by the total acreage of such farms gives a rent per acre which appears to me to mean very little indeed, and yet to attempt to convert the hillside acres into the equivalent of valley acres seems futile also, since the former are used for maintaining livestock, and the latter mainly for the production of cereals. Furthermore, since the acreage of the farms in the Bristol area varies from under 50 to over 2,000 acres, rentals per acre for comparison purposes are extremely illusory. Finally, correlation coefficients between rentals and other characteristics, such as capital, labour, or costs, seem to show conclusively that the classification of farms according to rentals is unsuitable.

#### TYPE OF FARMING

Let us now pass to the consideration of classifying farms according to the type of farming carried on. This method is satisfactory and is of course widely used by those engaged in agricultural advisory work. In fact we may say at once that grouping according to type of farming is indispensable, but among the agricultural economists there seems to be need for some agreed method of

doing this. At present this kind of grouping depends solely upon the opinion of either the economist or the farmer, and while, in many cases, it is easy to say whether a farm is, for example, a dairy farm, there are also many cases where the class is not so obvious, and this refers particularly to those farms on the borderline between two types of farming. Where farm accounts are available it is possible to use these in order to delimit the boundaries between one type and another, and, as most of us know, the income side of the accounts is usually considered for this purpose. That is to say, if any one farm has a fairly substantial proportion of its output in one particular kind of product, the usual method is to classify it according to that product. Here, again, however, the economists have agreed upon no rule, arbitrary though it may be. There is no agreement as to what limits shall be placed upon these proportions of the income; that is to say, a farm receiving half its total income from the sale of milk and milk products may be classed by one economist as a dairy farm, but another economist may require a higher or lower proportion of the total income to place that farm in the same category. It is suggested therefore that the economists of the various countries would make their work in farm management of more value to each other and to others engaged in agricultural science, if agreed definitions of types of farming could be formed. We should at least know what we meant by a dairy farm or a beef producing farm. To those working in areas of little diversification this suggestion may appear of little moment, but to those of us working in areas of very diversified farming the question is continually arising. The only note of caution I would like to sound here is that too many types should not be set up. Otherwise we shall probably come to the conclusion that the only satisfactory method is to "group each farm by itself."

If a satisfactory method of classifying farms according to type can be evolved, then possibly the next most significant grouping is that which depends upon either capital or labour. The latter factor is, I think, the more important since the cost of labour, even in an old country like England, now absorbs, owing to the considerable increase in wage rates after the war, probably a greater proportion of the total costs of production than any other single item. Capitalisation is so closely connected with the type of farming that it really forms a subsidiary method of grouping, which does not need to be considered further in this paper.

## CLASSIFICATION ACCORDING TO LABOUR REQUIREMENTS

It may of course be argued that labour requirements are also connected so closely with the type of farming and the capital required that they, too, form only a subsidiary method of grouping farms. There is, however, this great difference, namely, that capital requirements cannot easily be allocated as between crop lands and livestock, whereas labour requirements can be so apportioned. It is therefore considered that possibly the best combination of methods for classifying farms in order that advice may be given to farmers on non-economic, as well as economic matters, is that of type of farming coupled with labour requirements.

The actual method, as I see it, is to establish a kind of index of labour requirements, by weighting each department of a farm within a certain type, in accordance with the average labour needed on the various kinds of crops and livestock. This average is calculated from a representative number of farm accounts received by the farm management branch of a university, and is then applied to all farms within that type of farming found in the area for which the university is responsible, as far as agricultural advisory work is concerned. The only particulars required from farmers not submitting accounts to the university would be a statement of the acreages under the various crops and the numbers of each type of livestock carried. By this method a very rapid classification of farms can be made, and there would be established in the university a kind of index of farms. This index could then be subdivided as and when required for any specific piece of investigation or research.

Admittedly, the method is not perfect. One argument is, naturally, that to apply an average set of labour requirement figures to every farm within a particular type-of-farming class is misleading, because all the farms in that class will not need the same labour on the same crop. Provided, however, the index of labour requirements was not split into too small divisions, it is considered that the error will not be significant, that is to say, two farms with identical crops and numbers and types of livestock would find themselves in the same section of this classification although the management of the one may be more efficient than the other. In dealing with a large number of farms, for which, in fact, this method is intended, it is not anticipated that serious discrepancies will be very frequent, and, as the scheme is developed,



it will be found possible to give farms varying considerably above or below the average in labour requirements a plus or minus characteristic, which, in effect, will be an index of good or bad management. Such an efficiency index would be of considerable use to other people engaged in agricultural advisory work, for the ease and rapidity with which the economist could construct this index would enable the other agricultural advisers to make comparisons and to know what kind of man and farm they would find, when they received requests for their services.

#### CONCLUSION

In concluding this paper I should like to make a few remarks upon the attempts we are making at Bristol to apply statistical methods, especially in correlation, to establish a rapid and easy system of farm classification, and incidentally to arrive at a single figure or index, which can be used as an index of ability in management.

Simple correlations calculated between such factors as capitalisation, costs of production, farm incomes and labour requirements have given fairly satisfactory coefficients, even when various types of farming are mixed together. If we confine ourselves to one particular type of farming, somewhat better coefficients of correlation are found. Our problem is now to reduce the standard deviation of the deviations from the correlation line to a minimum, by handling a larger number of farms than we have hitherto done. Even so, we realise that perfect correlation will not be achieved, and it appears that the extent, by which we fall short of the mark, will give a very good index of the ability of the farmer as a manager. Differences in managerial ability are real and, we consider, should be capable of statistical measurement.

One could continue this paper indefinitely upon these lines, and the many refinements which are possible. The point I wish to make again is that a good deal of the value of farm management work is being lost, especially for comparison purposes, either between different areas in the same country or between different countries, simply on account of the fact that the question of classifying farms has not received adequate attention.